

CLAIMS:

1. An apparatus for dispensing particles onto a surface comprising:
a hopper for receiving particles including:
a hopper opening;
a screen disposed so as to cover the hopper opening; and
a brush disposed proximate to the screen such that bristles on the
brush contact the screen;
a cradle rotatably supporting the brush wherein the brush includes a
longitudinal axis; and
a pivot mount secured to the cradle, the pivot mount having a pivot axis
disposed perpendicularly with respect to the longitudinal axis of the
brush so as to allow the brush to rotate about the pivot axis of the pivot
mount.
2. The apparatus of claim 1 wherein the pivot mount supportably engages the
hopper with the cradle.
3. The apparatus of claim 1 and further comprising:
a cradle in supportive engagement with the brush; and
a quick-release mechanism securing the brush to the cradle.
4. The apparatus of claim 3 wherein the quick-release mechanism comprises:
a spring loaded mandrel secured to one of the brush and the cradle; and
at least one receptacle disposed in the other of the brush and the cradle
configured so as to supportably receive the mandrel.
5. The apparatus of claim 1 wherein the screen further comprises:
a screen portion;
a first support bar fixably attached to the screen portion and releasably
secured to the hopper at a first mounting point;
a second support bar generally parallel to the first support bar, and
releasably secured to the hopper at a quick-release second mounting point; and

wherein the first mounting point is disposed on one side of the hopper opening and the second mounting point is disposed on another second side of the hopper opening.

5 6. The apparatus of claim 1 wherein the second mounting point further comprises:

 a spring biased mount, moveable with respect to the hopper such that overcoming the spring bias allows the first bar to be secured or unsecured from the first mounting point.

10 7. The apparatus of claim 1 further comprising:

 a cradle rotatably supporting the brush; and

 at least one bristle pattern disposed on an outer annular surface of the brush.

15 8. The apparatus of claim 1 wherein the screen further comprises:

 at least one pattern formed by a mask over the screen.

20 9. The apparatus of claim 1 and further comprising:

 a shutter disposed proximate the screen so as to selectively allow particles through the screen.

25 10. The apparatus of claim 1 and further comprising:

 a feedback loop disposed so as to receive a signal from a monitoring device and vary the rate of dispensation of the particles.

30 11. The apparatus of claim 10, wherein the monitoring device comprises:

 a source configured to emit radiation;

 a detector disposed so as to receive radiation emitted from the radiation source;

 a radiation path defined by the distance between the source and the detector, the radiation path disposed between the brush and the surface; and

 a calculation device configured so as to compare the amount of radiation emitted by the source to the amount received by the detector.

12. The apparatus of claim 11, wherein the radiation is visible light.

13. The apparatus of claim 10, wherein the monitoring device comprises:

a power source;

an electrical circuit formed by the power source, particles disposed in the hopper, the surface, and particles disposed between the hopper and the surface; and
a calculation device configured so as to measure the amount of electrical current in the electrical circuit.

14. The apparatus of claim 10, wherein the monitoring device comprises:

at least one force sensor fixed to the hopper; and

a calculation device configured so as to measure the change in weight of the hopper.

15. The apparatus of claim 10, further comprising:

a cradle rotatably supporting the brush;

a drive mechanism engaged so as to provide motivating force to the brush;

and

a feedback loop connected to the monitoring device so as to vary the amount of motivating force provided by the drive mechanism.

16. The apparatus of claim 1 wherein the surface is a particle surface of a streaming web and further comprising:

at least one nip roller disposed downstream along the web from the brush;

a liner secured to the web downstream along the web from the brush; and

wherein the liner is disposed between the particle surface of the web and the nip roller.

17. A method for dispensing particles onto a surface comprising:

holding the particles in a hopper having an opening;

dispensing a screen over the opening;

passing bristles of a brush across the screen;

drawing the particles through the screen with the brush; and

dispersing the particles into the air such that they settle onto the surface.

18. The method of claim 17 and further comprising:
rotating the brush about a longitudinal axis; and
pivoting the brush about an axis perpendicular to the longitudinal axis.

5 19. The method of claim 17 and further comprising:
holding the brush proximate to the screen using a cradle;
releasing the brush from the cradle using a quick-release mechanism; and
securing the brush to the cradle using the quick-release mechanism.

10 20. The method of claim 19 wherein the releasing step further comprises:
retracting a spring loaded mandrel fixably secured to one of the brush and
the cradle from a receptacle disposed in the other of the brush and the cradle.

15 21. The method of claim 17 further comprising:
fixably securing a first support bar to the screen and releasably securing the
first bar to the hopper on one side of the opening at a quick-release first mounting
point;

fixably securing a second support bar to the screen such that the second
support bar is generally parallel to the first support bar;

20 releasably securing the second bar to the hopper on an opposite side of the
opening; and

disposing the second support bar generally parallel to the first support bar.

25 22. The method of claim 21 wherein the step of releasably securing the second
bar further comprises:

translating a spring loaded moveable portion of the quick-release first
mounting point away from a biased position;

attaching the first bar to the quick-release; and

30 allowing the spring loaded moveable portion of the quick-release first
mounting point to return to the biased position.

23. The method of claim 17 and further comprising:
forming a series of bristle patterns on an outer annular surface of the brush.

24. The method of claim 17 and further comprising:
blocking the passage of particles through certain parts of the screen.
25. The method of claim 17 and further comprising:
monitoring a rate of dispensation of the particles.
26. The method of claim 25 wherein the step of monitoring further comprises:
emitting radiation from a source;
receiving the radiation with a detector;
defining a radiation path between the source and the detector;
disposing the radiation path through the dispersed particles; and
calculating the amount of dispersed particles by comparing the radiation
emitted to the radiation received.
27. The method of claim 25 wherein the step of measuring further comprises:
electrically charging the particles in the hopper; and
calculating the current delivered to the surface by the charged particles.
28. The method of claim 25 wherein the step of monitoring further comprises:
weighing the hopper and particles before particles are dispersed;
weighing the hopper after particles are dispersed; and
calculating the amount of dispersed particles by comparing the weight of
the hopper before dispersing particles to the weight of the hopper after dispersing
particles.
29. The method of claim 24 and further comprising:
rotating the brush; and
altering the rotational speed of the brush according to the monitoring rate of
dispensation.
30. The method of claim 16 and further comprising:
continuously translating the surface in one direction under the brush;
disposing a liner over the surface and settled particles; and
translating the liner between the surface and a nip roller.